



The Impacts of Asteroids on Marine Animals and their Evolution

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DESCRIPTION

Asteroids are rocky bodies that orbit the sun and sometimes collide with planets or moons. When an asteroid hits the Earth, it can cause devastating effects on the environment and life forms. One of the most famous asteroid impacts in Earth's history occurred 65 million years ago, when a 10-kilometer-wide asteroid crashed into the Yucatan Peninsula, creating the Chicxulub Crater. This event is widely believed to have contributed to the mass extinction of about 75 percent of marine and land animals, including the non-avian dinosaurs

Effects of asteroid impact on the oceans

The asteroid impact released a huge amount of energy and debris into the atmosphere and the oceans. The debris blocked much of the sunlight, causing global cooling and darkness for months or years. This reduced photosynthesis and primary productivity in the oceans, affecting the food chain and biodiversity. The impact also generated shock waves, fires, tsunamis, acid rain, and dust storms that altered the temperature, salinity, pH, and oxygen levels of the seawater. These changes created stressful conditions for many marine organisms, especially those that depended on specific habitats or resources.

Survival strategies of marine animals

Despite the harsh environment, some marine animals managed to survive the asteroid impact and its aftermath. Some of the factors that influenced their survival were:

Size: Smaller animals had lower metabolic rates and energy demands than larger ones, and could hide in crevices or burrows to avoid predators or environmental stress.

Mobility: Animals that could move across different depths or regions had more chances to find suitable conditions or food sources than those that were sessile or restricted to certain areas.

Diversity: Animals that had a wide range of adaptations or behaviors could cope better with changing environments than those that were specialized or inflexible.

Reproduction: Animals that had high reproductive rates or could disperse their offspring widely had more chances to recover their populations than those that had low fecundity or limited dispersal.

Ecology: Animals that fed on detritus, bacteria, or other organic matter that accumulated after the impact had more food availability than those that relied on photosynthetic organisms or live prey.

Evolutionary consequences of the asteroid impact

The asteroid impact caused a major turnover in marine biodiversity, eliminating many groups and creating opportunities for others. Some of the evolutionary consequences of the impact were:

Extinction: Many marine groups went extinct after the impact, such as ammonites, belemnites, rudists, inoceramids, mosasaurs, plesiosaurs, and ichthyosaurs. These groups were either highly specialized, had low diversity, or faced intense competition or predation from other groups.

Radiation: Some marine groups diversified rapidly after the impact, filling the ecological niches left by the extinct groups or exploiting new resources or habitats. These groups include teleost fishes, sharks, rays, bony fishes.

Estuaries are bodies of water with a shoreline where rivers meet the ocean or another huge body of water, like one of the Great Lakes. Organisms that live in estuaries must be adapted to these dynamic habitats, where there are changes in the physical characteristics of the water, such as the rise and fall of tides, as well as fluctuations in the water chemistry, including salinity. Estuaries are extremely productive ecosystems in spite of these difficulties. Both sources of water provide nourishment to them, and they are able to maintain a wide diversity of life. People frequently reside near estuaries and can have an impact on the ecosystem's health due to their availability to food, water, and shipping routes.

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